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SCIENCE REVIEW OF THE YEAR

# SCIENCE NEWS LETTER

DEC 28 1937

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



December 25, 1937

**Santa in a Cave**

See Page 409

A SCIENCE SERVICE PUBLICATION

## Do You Know?

Aviation is becoming one of the chief methods of transportation in Alaska.

More accidents occur in gymnasiums than any other part of school buildings.

In seventeenth century England, geese were sometimes shorn like sheep, instead of being plucked for their feathers.

From what is known of the ancient history of ships, the Phoenicians and Greeks were first to build ships of special type for war.

A glass "cornerstone" containing records has been laid as the foundation block for a Department of Glass Technology at the University of Sheffield, England.

Switzerland uses French, German, Italian languages, and may add a fourth to its officially recognized languages—Romansch, a survival of ancient Latin, which is spoken by 50,000 Swiss people.

Lighthouse Service officials say that perhaps no fleet in the world is more dependent on aids to navigation than Great Lakes freighters that steer through dredged channels and dense traffic along the Detroit River.

Sun glasses made of a recently developed polarizing material are finding favor with fishermen because the glasses eliminate sky reflections on smooth water, so they can more clearly see the fish and stream bottom.

## SCIENCE NEWS LETTER

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## QUESTIONS DISCUSSED IN THIS ISSUE

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### PSYCHOLOGY

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Pueblo Indians have six cardinal directions—east, west, north, south, above, and below.

One greyhound has a record of running 600 yards in 34 seconds, which is a speed of 36 miles an hour.

Nicaragua has a grasshopper plague so alarming that U. S. government scientists have been consulted regarding ways to fight the pest.

The Central London tube may carry Londoners out eight miles farther, if a twelve million dollar project, already started, is completed.

The population of the United States on July 1, 1937, was estimated at 129,257,000.

German chemists have produced a substitute for the tin can—a container of transparent plastic with top and bottom of tin.

A school for the Canadian quintuplets is planned, in which they will be taught in company with 15 or 20 other neighborhood children.

In well managed forests, pine trees may grow three to four times as fast as those on land that is poorly managed and subject to fire hazards.

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REVIEW OF THE YEAR

# Science Progress in 1937

## New Particle Within the Atom; Bright Novae Far Away in Space; Cure of "Living Dead" Gifts of Year

By SCIENCE SERVICE STAFF

ON a wide frontier that extends from the interior of the atom to the farthest reaches of astronomical space, science forged forward during 1937. Some of the discoveries in the world's thousands of laboratories will bear fruit only in years to come. Others will be more speedily transformed into new industries, new cures for human ills, new gadgets for easier, better and more intelligent living.

Within the once indivisible atom was found still another fundamental particle. Pigmy telescopes found exploding stars, extraordinary in brilliance and distance. "Living dead" in mental hospitals walked forth to active life thanks to the shocking qualities of diabetes-conquering insulin. More and more is being learned about life itself, the way it is passed on from generation to generation and how the brain acts.

Scientists viewed with apprehension the growing war madness of nations. They wondered how their great gifts to humanity can be preserved for constructive peaceful purposes instead of used for destruction. Psychologists urged that relations between peoples and nations be guided by scientific methods into paths of sanity.

Bigger bridges, larger dams, more tunnels, faster and more efficient airplanes quickened the world's material tempo and compressed its geography.

Research presses onward, into 1938, motivated by the inquisitiveness of mankind and the urge for a better future.

ANTHROPOLOGY—ARCHAEOLOGY

### New-Found Fossils Prove Java Ape-Man Was Human

NEWLY discovered fossil remains of the Java Ape-Man, *Pithecanthropus erectus*, definitely proved that this primitive being was a human being, not an ape. Associated fossils indicate that this ancient race is not as old as was once supposed.

Other notable researches included:

Homo sapiens has something new to be proud of, since anthropologists in 1937 dug up evidence that our own species of mankind was

on earth much earlier than supposed. Skeletons in Palestine caves reveal Homo sapiens present among other, less enduring types of Old Stone Age man as early as 60,000 years ago.

Peking Man, who inhabited a China cave more than half a million years ago and whose remains have amazed modern science, became a more vivid figure from the past with discovery of a skull showing more clearly what his face was like. The new skull includes eye socket, nose bones and other previously unknown features.

Definite proof that man reached the Straits of Magellan just after the most recent ice age was unearthed in caves where firescarred bones of extinct ground sloths and horses were found under four other culture layers and a bed of volcanic ash.

America acquired new evidence of early inhabitants when Utah caves yielded flint and bone tools unlike those of Folsom Man and an infant's skeleton 5,000 to 10,000 years old.

Flints from southern California and Nevada afforded evidence of ancient men who camped on the shores of lakes which long since have dried up.

Folsom hunters of ancient America were more definitely assigned to the late Ice Age, when geologists in Colorado dated an earth

layer containing Folsom tools as belonging to that era.

The biggest human skull ever found was unearthed among Indian remains in Virginia.

Excavating Plains Indian sites took on a practical angle, when archaeologists reported these Indians apparently found certain areas undependable for farming.

Villages of Indians who met Columbus were excavated in the Bahamas.

Ruins of a pyramid near Guatemala City revealed Mayan Indians rebuilt the pyramid eight times.

Shattered thrones unearthed in Piedras Negras, Guatemala, inspired a new theory that social revolt helped destroy the Old Mayan Empire.

Chemical analysis demonstrated Ecuador's Indians actually achieved an alloy of platinum.

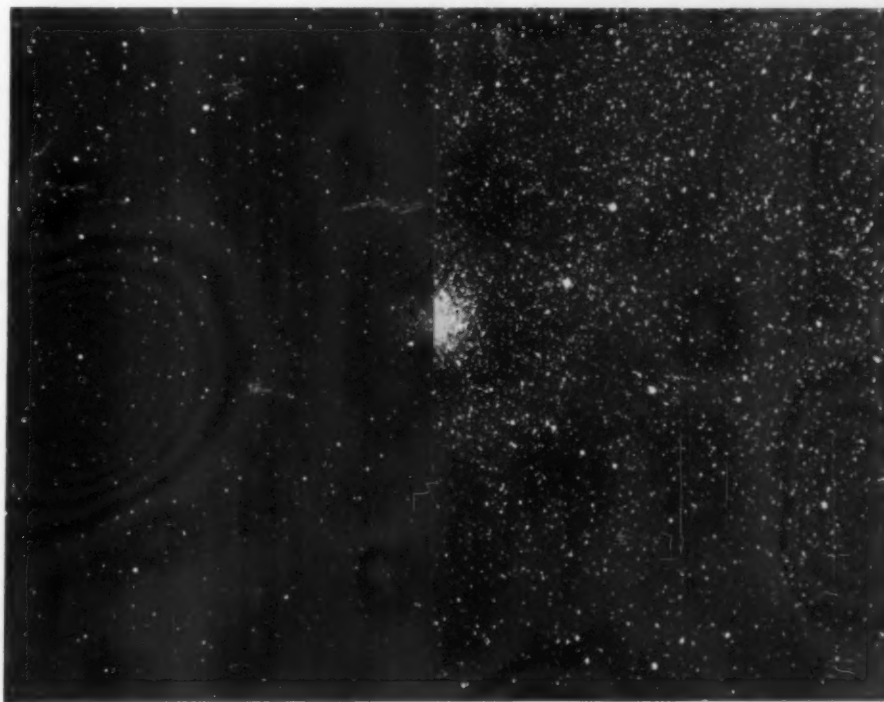
A new type of Stone Age man was unearthed at Steinheim, Germany, with skull older, yet partly more modern in type, than Neanderthal Man.

The long-sought Temple of Ares, god of war, was unearthed in the Athenian Agora.

Flint tools found near Bethlehem revealed man's existence in Palestine, at the dawn of the Stone Age.

Help for understanding politics in the Bible era was provided by finding several thousand letters to a Syrian king, about 1900 B. C.

A prince's palace occupied in five historic eras was unearthed at Megiddo, Palestine, and



NEW RETINA FOR TELESCOPES

New-type red-sensitive photographic plates show vast numbers of stars and star-clusters that old plates missed. Set edge to edge are two halves of the same sky region photographed by Carnegie Institution astronomers; left, with the old, right, with the new.

also a great hoard of ivory and gold art.

A real estate deed 3,500 years old, unearthed at ruins of Dura on the Euphrates, added over a 1,000 years to antiquity of that city.

Tepe Gawra, Mesopotamia, "world's oldest city," was revealed as having flute music, art vases, and fine architecture at the very early era of 4000 B. C.

A Babylonian mathematics book of 2000 B. C., which contained many ideas heretofore credited to Greek thinkers, was deciphered.

Excavations at Omar Khayyam's home town, Nishapur, brought to light beautiful objects proving it a great art center of Islam.

An underground ten-acre city with chapels and rooms full of mummified ibises and monkeys was discovered in Egypt.

Hand-marked deer bones in a Japanese cave strengthened Japan's claim to habitation in the Old Stone Age.

#### ASTRONOMY

### Two Super-Novae Seen In 1937—Rare in History

**D**ISCOVERY of two great exploding stars, super-novae the astronomers call them, through use of a relatively small Schmidt telescope operating from Mt. Palomar, Calif., the future home of the great 200-inch reflector, was an outstanding feature of the astronomy of 1937.

These super-novae, only 15 of which had been discovered in all previous history, were each 500,000,000 times the sun's brilliance and they were both extremely distant in the heavens.

Outstanding astronomical developments of the year include:

Most significant of the many astronomical inquiries is the widespread and continued probing into the structure of the universe, both within the galaxy in which we are located, and at the far reaches of the heavens where the sight of the largest telescopes grows dim.

The most extensive metagalactic cloud or star system, more than 50,000 times the Milky Way's size, was discovered.

Sprawling cosmic dust cloud near sky's north pole was discovered obscuring and reddening star light.

Two new interstellar gases, neutral potassium and calcium, were discovered.

A new system was discovered in Milky Way consisting of giant cluster of hundreds of stars which revolves about still larger cluster.

Total solar eclipse of June 8, was observed by expeditions to South Sea desert island, Peruvian Andes, from airplanes and steamer.

Sub-stratosphere airplane photographs of totally eclipsed sun, June 8, showed corona to be uniform, globular, million-mile-thick blanket.

Temperature drop of 1500 degrees Centigrade was observed between sun's surface and its overlying atmosphere.

Sunspots increased in number, bringing magnetic storms and radio fade-outs exceeding any previous sun spot activity since 1871.

Six new comets or asteroids were reported: Whipple comet, Wilk comet, Gale comet, Finsler comet which reached naked eye brilliance and developed two tails, Hubble comet, and Reinmuth object which moved very speedily.

Returns of the following periodic comets



#### RUBBER-TIRED SHARK

*Girdled with an old automobile tire, so snug-fitting that escape was impossible, a large shark was captured by two boys on the Cuban coast near Havana. Its picture has been added to the collection of ichthyological oddities maintained by Dr. E. W. Gudger of the American Museum of Natural History. Dr. Gudger believes that the shark, swimming around a garbage-dumping scow, plunged head-first part-way through the tire, then lashed itself into exhaustion in vain efforts to get free. He thinks that the fairly frequent capture of mackerel and other fish with rubber bands around their bodies represents the same kind of occurrence on a smaller scale.*

were observed: Daniel (1909), Grigg-Skjellerup, Schwassman-Wachmann, Encke.

Eros, tiny planet neighbor to earth, was shown to be shaped like a huge brick tumbling end over end in sky, which explains light variations.

Observations of Mars near opposition indicated Martian atmosphere contains less than five per cent the amount of water vapor in the earth's atmosphere.

The temperature of the surface of the planet Venus was estimated by Lowell observers to be 50° C.

The 200-inch telescope's mounting and dome were completed.

#### BIOLOGICAL SCIENCES

### Research Leads to New Knowledge of Early Life

**T**HE PAST year was marked by continued progress in techniques for the manipulation and control of life in its earliest stages. Unfertilized eggs of rabbits were sent into first stages of development when placed in contact with the sperm of rats. Fruit flies, important in genetical research, were artificially fertilized for the first time. Parts of sea-urchin eggs from which the nuclei had been removed were stimulated to divide to as many as 500 new cells by chemical and physical means. First commercial-scale production of chicks by artificial insemination of hens was tried.

Other important events in the life sciences were:

Paramecia, one-celled animals, previously thought to be without sex, were found to be of two kinds.

Catalase, important in the life of cells, was obtained in pure crystalline form.

Heartbeats of insects were recorded with a new mechanism.

Experiments showed that trout, like other animals, can have their breeding period changed by changing the length of time they are exposed to light each day.

Plant cancers, usually caused by germs, were experimentally induced with chemicals.

Rat embryos were grown for several days, in glass vessels containing a circulating nutrient fluid.

Flowers were induced to form fruit without pollination, through spraying with growth-promoting substances.

Water "activated" with X-rays was found to be toxic to plants and animals.

Major outbreaks of grasshoppers and Mormon crickets occurred in the West, and autumn studies of egg deposits indicated probability of similar outbreaks next year.

The white-fringed beetle, a new insect menace, was found in three Southern states and brought under control.

The Migratory Bird Treaty with Mexico was ratified.

A new organization, the Wildlife Society, was formed to promote the protection and restoration of native species.

The first nation-wide bird census was taken by the National Association of Audubon Societies.

A \$615,733 foundation was established at Harvard, for research on faster-growing tree varieties.

Germany entered the whaling industry, with the aim of reducing import of necessary fats.

Study of brains of lower primates showed them to be remarkably symmetrical, contrast-

ing with human and higher ape brains, which are somewhat lopsided.

Nine live gibbons, man's nearest ape cousins, were brought back from Indo-Malaysia, to found a study colony in Puerto Rico.

Specimens of the long-sought African peacock were brought to the United States.

#### CHEMISTRY—PHYSICS

### New Particle Heads 1937 Discoveries in Physics

**T**HE DISCOVERY of a new subatomic particle heads the list of 1937 achievements in physics and chemistry.

The new particle, yet unnamed and without a niche in the structure of atomic physics, is intermediate between the electron and the proton. It appears to possess either a positive or negative electrical charge and preliminary determinations of its mass placed it at about 150 times the mass of the electron.

Other outstanding events included:

Element No. 87 reported discovered and named Madavium.

Construction of a cyclotron atom smasher to generate potentials of 50,000,000 volts and costing \$100,000 was begun.

The concentration of the heavy isotope of nitrogen was announced.

Cosmic rays were found to have a small daily variation in intensity.

The oxygen in rocks has been found to be heavier than the oxygen in air or water.

Construction was begun on a new radium-refining plant at Port Hope, Ontario.

High-pitched sound waves were used to precipitate chimney smoke.

The most accurate determination of the force of gravity ever made in America was completed.

Ethyl cellulose was added to the chemical family of transparent wrapping materials.

Improved electrostatic high-voltage generator, operating in a pressure chamber to prevent electrical sparkover, was put in operation for atom-smashing experiments.

The molecular weight of visual purple, chemical compound in the eye's retina which enables man to see, was determined as about 800,000.

Glass fibers were more widely used for special textiles.

Tracks made by atomic particles in photographic emulsion were used to distinguish the nature of the particles.

Magnesium, featherweight metal, was refined by an electrothermic process at a cost less than aluminum.

The magnetism of the neutron was demonstrated.

Cosmic ray studies were started atop Mount Evans, Colorado, 14,259 feet above sea level, in a special shielded laboratory designed to resist the winds, cold, and static electric storms of the alpine region.

A primeval explosion which led to the expanding universe was suggested as cause of cosmic rays.

Seventy compounds closely related to life-sustaining chlorophyll were prepared synthetically.

Ten amino acids were pronounced essential to life and growth.

Tri-calcium phosphate was found to remove fluorine compounds from drinking water.

A laboratory plant which produces a gallon of valuable liquid helium per hour was completed.

Two hypotheses were advanced giving some other interpretation of the so-called "red shift" of light from distant nebulae than the familiar expanding universe theory.

The magnetic force of the basic unit of magnetism, known as the magneton, was determined.

Using "heavy" hydrogen atoms as tags, chemists were able to trace the storing of fat in the animal body.

Research disclosed milk sugar is made in the mammary glands of animals out of glucose and lactic acid.

By atomic bombardment titanium was made artificially radioactive, liberating gamma rays for periods useful in cancer treatment.

A tiny battery was developed, weighing less than two pounds and generating 1,000 volts.

Weak soap solutions were found to have better cleaning properties than strong solutions.

A rapid method of identifying ores by the iridescence of thin sections was developed.

Cosmic ray particles were observed smashing into the earth's atmosphere with energies of 10,000,000,000 volts.

Process was developed to age brandy in six days instead of months.

Techniques of microchemistry improved so that a sample weighing only one-300,000,000th of ounce sufficed for accurate analysis in some cases.

Production of synthetic coal overthrew theories on coal's formation.

A process for extracting carbon dioxide from flue gases reached the stage of commercial application.

Considering only the shortest, straight line distance between points of observation, radio waves were shown to travel at only 50 to 85 per cent of the 186,000 mile a second theoretical maximum velocity.

Methyl bromide was found to be efficient as a fire-extinguishing chemical.

Improved long distance radio reception was noted.

Synthetic plastic lenses for spectacles and other uses were developed.

New steam tables detailed the properties of steam more precisely than ever before, and to higher pressures.

A new milk container, the fibre milk bottle, was placed on a production basis and used for home deliveries.

Electronic communication systems exemplified by electric signs operated by motion pictures, came into use.

The magnetic amplifier, a non-electronic device, was developed as a competitor of vacuum tubes in some kinds of work.

#### EARTH SCIENCES

### Fireless Volcanoes Found Like Meteor Craters

**D**ISCOVERY that the puzzling "cryptovolcanic structures"—volcano-like formations without evidence of subterranean fire—resemble the eroded remains of meteor scars is one of the outstanding achievements in earth sciences this year.

Falling meteoric masses of great size, practically unimpeded by air friction, release energy in landing sufficient not only to backfire themselves out of the crater, but to throw the underlying rock into wavelike formations, which may be recognized even after thousands of years of erosion, it was discovered.

Other developments in earth sciences during the last year were:

Story of the ice ages was read by cores of mud taken from bottom of Atlantic with "gun" sampler.

A weather station near the North Pole was established by Soviet scientists through use of air transport.

Two new rare minerals, antofagastite and bandylite, were discovered in Chile.

The site of the dinosaurs' "last roundup" in Utah was explored by paleontologists.

Australopithecus, strange extinct ape of South Africa, was shown to have marked humanlike characters in teeth, shape of face, and other details.

Studies of marine canyons showed that their extent and numbers were greater than heretofore supposed, but gave no certain clue to their origin.

Fossil pollens in peat bogs show that, compared with present temperatures, the climate was warmer just after the most recent ice age, then cooler only a few thousand years ago.

The earth's age was checked by studies of radioactive potassium, and the figures agreed closely with those found from studies of uranium.

Life appeared on earth at least 1,250,000,000 years ago, according to studies of the radium and helium content of the oldest rocks containing evidence of life.

Glass meteorites were discovered in Australia.

A perfectly preserved hairy mammoth probably more than 10,000 years old, was found frozen in a Siberian bog with hide and flesh intact.

Geophysical methods of prospecting were widely adopted in Canada, where more than 99 per cent of the area is covered by glacial drift which makes ordinary prospecting methods ineffective.

Igneous rocks found in the Edsel Ford mountains of Antarctica suggested that the south polar mountains are related to the southern tip of the Andes.

New types of fossil reptiles, related to the dinosaurs, were found this year in Brazil, Texas, Wyoming, Utah, and Colorado.

The possibility that the 41,000,000,000 tons of water, to be backed up by Boulder Dam, might cause earthquakes was studied by seismologists.

Earthquake epicenters were found to move during the quake as adjustments of earth stresses progress.

Earthquake noises, ranging in volume from that of a whisper to that of a quarry blast, were found to convert up to one ten-thousandth of the energy of an earthquake into sound waves in the air.

Fossil bones of a hippopotamus-sized mammal that lived in Colorado forty-five million years ago, when the Rocky Mountains were a flat grassland, were discovered.

Plants buried by the ash thrown out in the great eruption of Katmai Volcano, in Alaska, in 1912, are already becoming fossilized.

Insects, hitherto not re- (Turn to Page 410)





TIMBERLINE TREE

*For three hundred years and more this tree battled the high winds and bitter cold of the high country of Colorado. Sheltered behind a glacial boulder, the tree took full advantage of the short annual growing season, finally succumbing to a series of too-severe winters. Recent coring of trees like this show that it takes them three hundred years or more to reach a diameter of six inches. This tree was probably a seedling when Juan de Onate led his starving army from New Mexico to the nearby headwaters of the Platte, seeking gold that he walked over but never found. The photograph is by R. L. Ives.*

## GEOGRAPHY

## Ice Floe of Polar Scientists No Longer is Northernmost

**Men Are Cheerful in Their Work; Guard Their Lamps And Briefcase of Data With Jealous Care**

By ERNST KRENKEL

Radio Operator, Soviet North Pole Expedition.

OUR drifting ice-floe can no longer be called the northernmost ice-floe on the globe. The northern part of Greenland has been left behind.

Our camp can be noticed from a distance of ten to fifteen meters. Like a precious stone shines Jenya Fedorov's ice observatory, lighted by the lamp of an electric torch when Fedorov is engaged in his observations. There is a wide passage around our tent. It is not very comfortable here during a snow storm, for the thin snow penetrates through the thickest clothes.

Our tent resembles a richly candied

cake, on the top of which stands out a single black raisin—the insulator of our antenna. The tambour is tightly closed by a triple apron-like door. When coming inside you must fasten it otherwise the apron will start flapping. The tambour is fully taken up by 4 pairs of so-called "slippers." A two-month old baby can freely be bathed in each of them.

Now take off your boots and shake off the snow with a whisk broom. This is done on an ice foot-board covered with fur. For a long time our dog Vessyoly used to block our way here. He was expelled from there for an unhealthy curiosity he used to show for butter.

The fur-lined rubber door opens with

great difficulty. It is held by a rubber band fastened to a pole of the tent. The half-year experience taught us to pass dexterously through this door, even when carrying hot tea-pots and saucepans.

By the way, we must once and for all put an end to the definition of our dwelling as a tent. This is a real rigid dwelling house with only its roof made of cloth. In the summer time we had a few things in our house. The winter conditions, however, required a considerable increase in their quantity. But we are so accustomed to our dwelling that we find it even roomy.

### Narrow Quarters

Amidst the vast expanse of the Arctic our "dwelling" space is limited to 3 square meters. This is all that has been left unoccupied by various things.

To the right of the entrance there is the wireless station. Below—storage batteries and tools. To the left of the entrance is suspended a box which we proudly call our cupboard. On the floor stand Shirshov's boxes with samples of water and on them several smoke-stained saucepans containing our simple dinner. Here, too, are the chronometers. The longer walls are occupied by double-tier beds.

A small worn-out briefcase hangs on a piece of string at Shirshov's feet. We look at it with great respect. Here are enclosed the secrets of the North Pole, the dreams of mankind which have come true; the fruit of six months of our intense life, a great many hours of hard physical labor. One would rather lose his head than this old briefcase. Between the beds stands a table occupied with our laboratory. Over the table hangs a thin piece of sheetiron protecting the ceiling from the heat of the lamp. My duty is to cover this piece of sheetiron with brittle frozen sausages.

Each of us has a corner for himself where our junk is kept. Papanin has a particularly great quantity of it. He sleeps on pieces of string and wire, notebooks, matches and books. He must have all of it within his reach.

In the day-time the lamps stand in the middle of the tent and like fire-work-shippers we all crowd around them. Touching the lamp glasses is strictly prohibited. This is the privilege of the chief pontiff Papanin. Don't ask how many more lamp glasses are left. As a good house-master he will say "ten" though there are fifteen of them.

The few free spaces on the walls are used to hang up our arms, lanterns and bundles of books. Our "drug-store" box is suspended from the wall on a piece

of string. Shirshov bravely defends the remnants of gauze, the whole supply of which was spent for house-keeping purposes. The walls of the tent are silvered with frost, out lamps burn dimly, but our tiny closely-knit group works with ardor, is cheerful and happy.

*Science News Letter, December 25, 1937*

## PSYCHIATRY

## Russia Has More Ills of Youth, U. S. More Senility

**T**HE MENTALLY ill in Russia are much younger than those in the United States. If you should go through a hospital in Russia you would notice large numbers of young people between 20 and 29 years of age. In this country, you would see older people of 50 years and upward.

The very different nature of problems facing those charged with the planning of mental hygiene in the two nations was brought to the attention of American mental hygienists by Dr. Ira S. Wile, of Mount Sinai Hospital, New York.

Schizophrenia, mental disease of youth, is the diagnosis for 39 per cent of the mental patients admitted to hospitals in Russia. The percentage is only 22 in the United States. Uncle Sam, to balance the scales, has a larger proportion of senility and other diseases of old age, Dr. Wile found.

To a certain extent, population experts can account for this in the divergence in age of Russians and Americans. In Russia birth rates are high and death rates also high. Many are born into the world, but relatively few live to the age when arteries harden and minds become dimmed with the years.

The United States grows older. As births decrease and medical science prevents deaths from children's diseases, more and more of our population are living to be over sixty and subject to the ills of old age.

At their last census when ages were reported, Russia had about 17,000,000 youths as compared with some 11,500,000 in the United States. Yet the United States with a smaller total population had actually a larger number of those over 60—10,500,000 to Russia's 10,000,000.

*Science News Letter, December 25, 1937*

Some cities have passed laws limiting the time that trailer-residents may stay.

Fire-resisting cables covered by a new insulating material are being made in England.

## PHYSICS

## Idea of Particles Discarded As Unnecessary For Physics

**T**HE IDEA that atoms and electrons are particles is now discarded by the science of physics as unnecessary, it was revealed at a Franklin Institute symposium.

"Particles," said Dr. W. F. G. Swann, director of the Bartol Research Foundation, "apparently exist in a kind of mental fluid of the mathematicians from which they can be precipitated at will by suitable mathematical treatment."

Models of the atom that laymen can

understand are now mere ghosts wandering around trying to find some role that will restore them to their proud state of a decade ago.

The theoretical physicists of today are viewed as explorers who cross the frontiers of knowledge, pass from the world of common experience into the unknown by means of mathematical concepts and symbols. By changing the symbols they arrive at predictions of what should actually happen.

*Science News Letter, December 25, 1937*

## ANTHROPOLOGY

## Japanese Living in Brazil Are Raising Eastern Crops

**C**ROPS of the Far East are being added, one by one, to Brazil's standbys, coffee and rice. And Japanese farmers are doing a large share of the labor, in Brazil.

For some years, recently, it has looked as though Japan might find the great spaces of Brazil very useful to absorb hordes of immigrants. More and more Japanese sailed for a promised land in this part of South America, heading particularly for southern Brazil where colonies of their nationals were growing fast.

By 1934, Brazil found herself getting more immigrants from Japan than from any other land, except Portugal. In that one year, 27,000 Japanese arrived.

And then, the Brazilian congress sharply closed the doors of the country, to a comparatively narrow crack. Japan could send 2,000 people, no more, in a year.

As the situation stands, about 150,000 Japanese are established colonists in this South America country, most of them in the state of Sao Paulo.

Describing an important colonial settlement of these people, Prof. Preston E. James states in the *Geographical Review* that the town proper is like others of tropical Brazil. But around it is old Japan—farm buildings, rice and tea fields, even feathery bamboo.

Between 1932 and 1934, he says, Brazil's Japanese farmers "dominated the

new crops that have recently started to compete seriously with coffee. They produced 46 per cent. of the cotton, 57 per cent. of the silk, and 75 per cent. of the tea."

He adds that figures for the state of Sao Paulo reveal facts "that must make every interpreter of lands and peoples stop and think." Japanese make up only 18 per cent. of the people there, and occupy less than two per cent. of the farm land. But they account for 29.5 per cent. of Sao Paulo's agricultural production.

*Science News Letter, December 25, 1937*

Soil erosion is threatening some African tribes, causing famine and unrest, as wasteful farming and grazing practices wreck the top soil.

## ● RADIO

December 30, 4:15 p. m., E.S.T.

THE YEAR IN SCIENCE—Watson Davis, Director of Science Service.

January 6, 4:15 p. m., E.S.T.

WORLD WIDE WEATHER—Dr. W. R. Gregg, Chief of the U. S. Weather Bureau.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.



## STERILIZING

Miss Ruth Elmquist and James Kettering of the Bureau of Home Economics, with Harry Humfeld now of the Bureau of Plant Industry, developed a process for sterilizing wool blankets without damage to the fiber itself. It is welcomed by hospitals. (See SNL, Nov. 13)

## ENGINEERING

## Ancient Assyrian Scheme Protects Mississippi Banks

**K**ING Sanherib, of Assyria, never heard of the Mississippi River. He died 2500 years before white men ever saw the Father of Waters, but today, engineers are applying a modification of one of his ideas to the problem of flood erosion of the Mississippi's banks. Asphalt and bricks, in a sloping bank, helped the ancient Semitic king to fight floods on the Tigris. Today, asphalt and woven wire help army engineers control the Mississippi.

Concrete blocks, tried with little success to prevent bank erosion on the Mississippi, were extremely costly and short-lived. Twenty years ago, Lt. Col. George M. Derby, Army Engineer, started experiments with asphalt mats, which he believed would be cheaper and more satisfactory than concrete. Today, on an immense barge, mats 300 by 50 feet, reinforced with woven wire, are manufactured and installed in the river bed. Unlike concrete blocks, the asphalt mats bend without breaking, fitting themselves to each small inequality in the river bed.

Science News Letter, December 25, 1937

## PHYSICS

## "Empty" Space Not Empty; Is Filled With Many Things

**"E**MPTY" space, out between the stars, is anything but empty. Research by astronomers of the Carnegie Institution of Washington shows that all sorts of things are rattling around in it. Although it is much closer to a perfect vacuum than anything human means can produce in a laboratory, an average cubic yard of it is stocked with:

- Twenty million free electrons.
- Twenty million hydrogen atoms.
- Five sodium atoms.
- One potassium atom.

Four hundred thousand photons, or "light-darts."

In addition, there is one calcium atom for every ten cubic yards of inter-stellar space, and one titanium atom for several hundreds or thousands of cubic yards.

Larger units of matter, averaging perhaps the size of a smoke particle, also float about, as cosmic dust. One such grain might be filtered out of each 1,000,000,000,000,000 cubic yards of inter-stellar space.

Science News Letter, December 25, 1937

## METEOROLOGY

## Twelve Kinds of Snow Recognized By Science

**T**O MOST of us to whom snow only means a job of shovelling, it may help a bit (at the next siege of back-breaking exercise) to learn that scientists classify snow into at least 12 different varieties. Right off, there is falling snow and fallen snow. That's easy. And some of us have recently learned about powder snow through the present trend to ski-ing.

But did you ever hear of sand snow, or wild snow, or sun crust or rain crust snow?

Let's start with falling snow. It is precipitation frozen into some type of crystalline form. When it hits the ground it becomes fallen snow. At first fallen snow is powder snow, soft, fluffy and feathery and not unchanged from its in-the-air condition. Skiers look for it.

But powder snow, if it comes to earth at very low temperatures, may form sand snow on which neither a ski nor sled will glide. Greenland explorers have reported sand snow. Wild snow, is another form of powder snow which falls in a complete calm at low temperature and is immensely unstable.

Following first contact snow enters the stage of settling snow. It becomes settled snow which can take the close-lying powdery form which makes the best of all ski-ing.

The next stage in snow's evolution is to pass from the new to the old snow classification and the state of new firn

snow is reached, where the snow is becoming granular and compacted. Variations of firn snow include the sun crust and rain crust forms where melting occurs, and then freezing, with a crust resulting.

Finally advanced firn snow arrives which turns either into firn ice or glacier ice.

Science News Letter, December 25, 1937

## GEOLOGY

## Odd Trick of Dripstone Builds Santa Claus Image

See Front Cover

**S**ANTA CLAUS is traditionally supposed to live in a vast cavern-workshop at the North Pole, yet something that looks very much like him can be seen in a cavern in our own Southland. In the limestone formations known as Aladdin Cave, in Madison County, Alabama, stalactites dripping from the ceiling and stalagmites slowly mounding from the floor have met and merged, in such shape and markings that even the least imaginative of mortals can easily see (at any rate just before Christmas) a rough but recognizable image of the children's favorite saint.

If you have trouble recognizing the saint, just turn the picture upside down

and see a more gnome-like Santa bent over by a heavy load and with a doll dangling from his arm.

For the photograph on the cover, the

SCIENCE NEWS LETTER is indebted to Dr. Walter B. Jones, state geologist of Alabama.

*Science News Letter, December 25, 1937*

#### PSYCHOLOGY

## Propaganda Analysis May Protect You Against It

**P**OWERFUL weapon in war and peace, in education and in delusion, is artful propaganda.

Rousing emotions, deliberately avoiding appeals to the intellect, propaganda is potent in producing action without deliberation. Under its influence, men and women may assume and perform acts that later in sober retrospect are sincerely regretted.

Examination and analysis of propaganda is the only defense of the consumer against such unconsidered action. Aid is given in a discussion of common propaganda devices contained in the current issue of "Propaganda Analysis."

First is the device of "Name Calling." Humans are so constituted that they build up strong dislikes for certain labels. Anything, good or bad, to which such a label happens to become attached is automatically rejected. Some of today's bad names as listed in the discussion are: Fascist, dictator, Red, Communist, economic royalist, rabble-rouser. You will undoubtedly recall others of a few years back: Bosche, slacker, pacifist, profiteer.

The name "chiseler" had a great vogue during Blue Eagle days but is no longer quite so potent.

Other devices are (1) "Glittering Generalities" by which the propagandist identifies his program with "the right" by use of virtue words such as: Social justice, liberty, public service, democracy. (2) "Transfer" by which the prestige of an established institution, church or nation, is made use of. (3) "Testimonial" or the use of big names. (4) "Plain Folks" such as the old familiar front porch campaigns. (5) "Card Stacking" against facts, ranging from carefully placed emphasis to downright lies. (6) "Band Wagon" by which we are urged to follow the crowd.

If you keep this list of propaganda devices in mind and watch for them in radio talks, in articles on politics or current topics, even in the arguments of your friends, you will be amused to see them cropping up again and again and in this mood your emotions may not be carried away.

*Science News Letter, December 25, 1937*

#### ENGINEERING

## Wood Is Major World Fuel; But Coal Is Power Leader

**I**N this modern world it may come as a surprise to know that an eighth of the power used by mankind is from firewood, most primitive of fuels. This is approximately twice as much as comes from water power.

Coal is responsible for 56.6% of the 1935 world power supply, with 16.5% from oil. Lignite and gas furnish 3.7 and 3.8%.

In the last quarter century the proportion of the power derived from coal has decreased although it has been stationary over the last four years. Oil and water power use has risen.

Because of increased efficiency in the use of coal—making more iron and steel through the use of the same amount of coke, for instance—it is expected that there will be a decline in the consumption of coal even with accelerated industrial development.

Because coal and oil are irreplaceable natural resources there is cause for long-time satisfaction in such better economy. Experts foresee that the protection of oil and coal resources will be first attained, as Dr. E. F. Armstrong, London chemical consultant, expressed it, when these materials cease to be squandered and are

used only in the form of residual products after more or less extensive chemical changes. The burning of raw coal may some day become an industrial if not a legal crime.

Countries without natural oil may bring about relatively large scale production of synthetic oils from coal much earlier than now predicted.

The crackling log on the open fire seems not to be destined for world extinction for many years to come, if ever. Wood as fuel is still of prime importance in heavily forested and thinly populated areas. The chemist eyes wood jealously because of many complex compounds within it. He may eventually present us with synthetic logs for our fireplace, compounded from the residues of his chemical utilizations.

*Science News Letter, December 25, 1937*

#### ANTHROPOLOGY

## Man Got Up On His Legs Before He Could Think

**M**AN learned how to stand up before he learned how to think.

This was one of the points developed in an address before the New York Academy of Sciences, given by Dr. Dudley J. Morton of the College of Physicians and Surgeons, Columbia University.

The animal ancestors of man were quadrupeds, Dr. Morton said. In a tree-dwelling phase of life they gradually learned first partially erect, finally fully erect posture and walking.

"Since attainment of upright posture preceded any high development of reasoning powers," commented Dr. Morton, "the change was obviously conferred or imposed on our prehuman ancestor through the orderly workings of Nature and could not have been accomplished through any enlightened choice on his own part."

*Science News Letter, December 25, 1937*

## From Page 405

ported from Cretaceous beds, 100,000,000 years old, have been found in Cretaceous rocks of eastern Colorado.

Apataelurus, a primitive carnivorous mammal of 50,000,000 years ago, whose remains were found recently in Utah, greatly resembled the saber-toothed tiger that lived only 1,000,000 years ago.

Publication of the findings of the Byrd Antarctic Expeditions was made a government project.

Numerous cooperating agencies compiled the first weather cyclopedia of North America.

Record-breaking floods visited the Mississippi, Ohio and Connecticut valleys during

1937, causing great property damage and accelerating flood-control work.

McGonigle No. 12, deepest oil producing well in the world, was drilled to 10,569 feet.

Stream pollution by sulphuric acid, derived from the oxidation of pyrite in abandoned coal mines, has been prevented by sealing a large number of mines.

Studies of earth magnetism were continued in the S. S. Research, replacing the non-magnetic ship Carnegie which was recently destroyed in an explosion in the south seas.

Climaxing five years of continuous work, the Mount Washington weather observatory, located in the coldest spot in the eastern United States, was incorporated, and plans were made for continuing weather study and forecasting.

Dinosaurs may have witnessed the destruction of planets whose fragments now fall to earth as meteorites, according to studies which show the age of meteorites as only about 100,000,000 years.

#### ENGINEERING—TECHNOLOGY

### Increased Value Placed On Technological Research

**T**RASCENDING the mere building of bigger bridges and the breaking of records, is the growing appreciation on the part of the public of the effect of technology upon the social structure of nations and the world.

The National Resources Committee listed the following inventions as likely to be widely used with social effects: Mechanical cotton picker, air conditioning, plastics, photo-electric cell, artificial fibers from cellulose, synthetic rubber, prefabricated houses, television, facsimile transmission, trailers, gasoline from coal, steep-flight aircraft, tray agriculture.

Among the engineering and technological advances of 1937 were:

Golden Gate bridge and the San Francisco-Oakland Bay Bridge were completed and a man-made mile-square island created between them.

A coaxial cable carrying 240 simultaneous telephone conversations or one television message was put in operation between New York and Philadelphia.

Television of 441 lines was demonstrated.

Television tubes were made available commercially.

A new method of switching telephone calls, in which connections are made by closing relay-like contacts, is being put into use.

The first rural telephone central office to be served exclusively by wires plowed underground was placed in service.

Automatic radio receivers were authorized on U. S. ships.

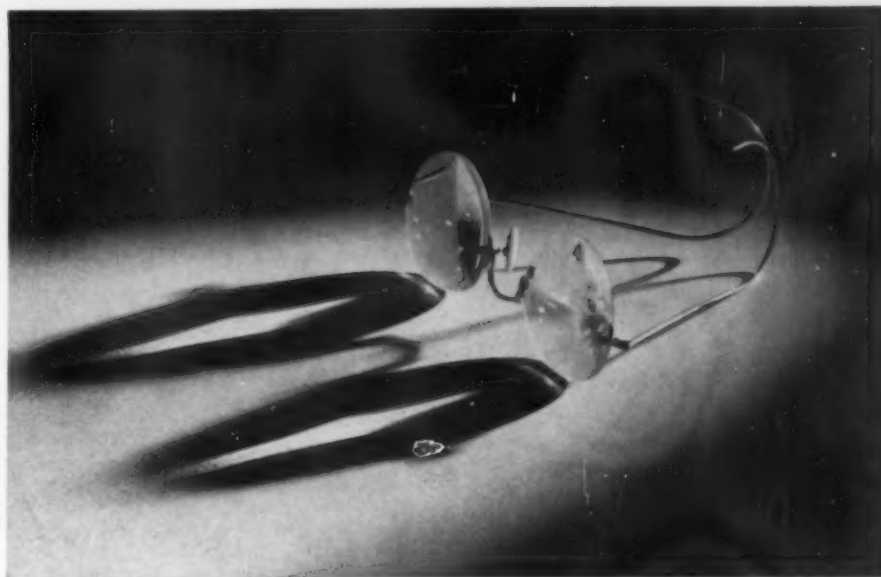
High-pressure mercury vapor lights were introduced commercially.

A method of sterilizing wool fabrics without injury was perfected.

A panchromatic photographic film three times the speed of fastest previously used was introduced.

Fatigue failure of machinery parts was traced to minute surface cracks which can be eliminated by initial polishing.

Heat treated cast irons were used for gears and other parts formerly made of steel.



"UNBREAKABLE"

*Moulded from sheets of new transparent plastics are these light, comfortable glasses that do not endanger the eyes by likelihood of breaking. They are made by the Rohm and Haas Co.*

Research in physical nature of lubrication led to treatment of lubricants to permit much higher bearing pressures.

High octane anti-knock gasolines at lower cost promised increased fuel efficiency for airplanes.

A new type of handset telephone with bell and coil in base was introduced commercially.

Carbon dioxide filled incandescent lamps, providing artificial daylight, were commercially perfected.

The world's first "free-flight" wind tunnel for aeronautic research was completed.

A new blind landing radio beam with antenna in an underground pit at the field's center was developed.

Improved tricycle type landing gear was available to private owners on several commercial aircraft.

The effects of roughness on wing surfaces was determined in new high-speed wind tunnel.

A new nose-slot N. A. C. A. cowling for radial air-cooled engines was developed to give better cooling and less drag.

Pressure water-cooling systems were applied to aircraft engines using pressure of 30 pounds per square inch.

Silver bearings were adopted in high power aviation engines.

An improved rotating-wing aircraft was developed using feathering blade control.

Survey flights for transatlantic air travel were made successfully.

Scheduled transpacific air travel was established.

A new world's aviation record for distance, 6305.7 miles, was made in a Soviet airplane from Moscow over the North Pole to San Jacinto, Calif.

A new unofficial landplane speed record of 379.16 miles per hour was established in Germany.

A new altitude mark for heavier-than-air craft was set at 53,937 feet in England.

The Normandie made eastward and westward record crossings of the Atlantic.

A new auto speed record of 311.42 miles per hour was established.

A motorboat speed record of 126.325 miles per hour was set.

#### MEDICAL SCIENCES

### Animal Disease Virus Molecule Without Life

**O**F far-reaching promise was the report that the viruses of at least two animal diseases, in addition to those of certain plant diseases, are non-living protein molecules. New and more successful methods of treating and preventing the largely unconquered group of virus-caused ailments, to which belong infantile paralysis and encephalitis, may result from the new knowledge of the nature of the causes of these diseases. It has even been suggested that this discovery may give a clue to the secret of life itself, since it gives scientists a chance to study the phenomenon by which non-living matter appears to become endowed with characteristics of living matter.

Other outstanding medical events of the year follow:

Discovery that jaundice temporarily checks the progress of chronic deforming arthritis suggests that some degree of control of this crippling, disabling disease may be accomplished.

Congress appropriated \$750,000 for a National Cancer Institute building and \$400,000 for cancer research and control during the fiscal year.

Cures by sulfanilamide of Type III pneumonia, gonorrhea, kidney and urinary tract in-

fections, meningococcus meningitis and gas gangrene were announced.

A so-called elixir of sulfanilamide caused over 80 deaths by poisoning from diethylene glycol used as a solvent in the remedy.

Cholera became epidemic in China and Japan, infantile paralysis in the United States and Canada, and influenza in Europe and America during the year.

Malnutrition was pronounced a world-wide problem by a League of Nations commission.

A National Foundation for Infantile Paralysis to strengthen and mobilize medicine's attack on this disease was formed under the leadership of President Franklin D. Roosevelt.

The question of state and federal aid in providing medical care was widely discussed.

Discovery that ether-extracted wheat germ oil may cause sarcoma in rats gave first evidence that a product of vegetable origin could cause malignant tumors.

A sugary substance from a common disease germ, the colon bacillus, was found to kill one kind of cancer in rats in 24 hours without destroying healthy body tissue.

Use of a new direction-finder makes possible repair of fracture of the head of the thigh-bone in 20 minutes through a 1½ inch incision without cutting muscles and with the patient up in a chair 48 hours later.

Brain wave studies suggested that sugar injections or inhalations of carbon dioxide may prove useful in the treatment of epilepsy.

First results in treatment of pneumonia with hydroxyethylapocupreine, a new drug derived from quinine, hold out hope that this remedy may reduce pneumonia deaths.

Treatment of gonorrhea by artificial fever and also by a new antitoxin was announced.

First successful treatment of the rare skin disease, scleroderma, was accomplished by electrical induction of the drug mecholyl.

Large doses of vitamin D—300,000 units daily—were found effective in treating psoriasis, a skin disease.

Silicosis prevention was suggested by mixing protective dusts or chemicals, including aluminum dust, with mine dust causing this disease.

Inclusion bodies in measles were claimed to have been made visible for the first time with a black dye promising a method of earlier diagnosis.

The addition of zinc to insulin, experiments indicated, may greatly improve the effectiveness of this diabetes remedy.

Laboratory-made spinal fluid is yielding new knowledge on a test for diseases such as meningitis, encephalitis and syphilis.

A craving for vitamin B<sub>1</sub>, which may be the strongest of all animal cravings, was discovered in rats.

Ovulation can now be detected electrically and the process has been induced in rabbits by electrical stimulation and the brain center for the process located.

Some of the damage done in prostate gland disease may be remedied by doses of one of the male sex hormones.

A new male sex hormone, epiallopregnalone, minute amounts of which aid the development of male sex characteristics in birds, man and other animals, has been isolated and made synthetically.

Two new adrenal gland hormones were discovered, one of which brings maturity to sexually undeveloped boys and the other increases virility in male rats but causes atrophy of sex glands in female rats.

For the first time a man-made radioactive substance, radiosodium, was used to treat human disease.

The spread of cancer through the body was

demonstrated by color moving pictures showing cancer fragments apparently drifting into the blood in a vein of a rabbit's cancerous ear.

Neutrons, newly discovered atomic particles without electric charge, were found to be more effective than X-rays in destroying breast cancer of mice.

X-rays kill cells by suffocation, it was found in studies which also showed that cancer cells are more susceptible than normal cells to X-ray because they have a "greater speed of life."

Virus of encephalomyelitis of horses was transmitted experimentally by a tick, first instance of filterable viruses being transmitted by a tick of the genus Dermacentor.

Rocky Mountain spotted fever germs were grown for the first time on artificial culture media.

Discovery of the possible transformation of a microorganism, *Aerobacter aerogenes*, into colon bacillus in the human intestinal tract suggested need of new tests for safety of drinking water.

A new chemical, leukotaxine, produced by injured cells and playing an important part in the body's fight against disease, was discovered.

A new vitamin, P, closely related to vitamin C and found in lemons and paprika, was discovered.

An anti-blood-clotting substance which is probably not heparin was obtained from the brain of sheep and pigs and is expected to shed new light on the problem of blood coagulation.

A new digestive hormone, enterocrinin, was discovered and extracted from the large intestines of man and other animals.

The production of high blood pressure experimentally by reducing the blood supply to the kidney without producing nitrogen retention may throw new light on certain types of high blood pressure in man and opens new fields for important investigations.

It has been shown that patients with chronic heart disease may be materially improved by the administration of large doses of vitamin B complex.

The study of appetites in rats was shown to be a promising method of indicating metabolic needs in glandular disorders.

#### PSYCHOLOGY—PSYCHIATRY

### Shock Therapy Brings New Hope for the Mentally Ill

**M**OST hopeful was the first experimental use in the United States of shock by insulin, metrazol, or other drugs for the treatment of the widespread mental disease dementia praecox. This treatment has demonstrated that the brain is not deteriorated in these afflicted persons but only functionally deranged.

Wider and more intense interest in practical social problems—war, unemployment, strikes, political attitudes—involving an understanding of human behavior was a significant growth in the field of psychological research.

Other outstanding developments in psychology and psychiatry were:

Diagnosis of epilepsy was accomplished

through brain waves, detecting hitherto unsuspected cases.

Calcium was successfully used to calm excited mental patients and banish their hallucinations.

Use of sleeping medicines was found to be partly responsible for an increase in mental disease.

Feeble-minded persons were brought under state control in South Dakota as a step toward limiting the incidence of this defect.

Chimpanzees can become addicted to morphine, displaying craving as well as physiological symptoms, and are thus suitable for testing effects of narcotic drugs, it was discovered.

Brain wave study led to revision in conceptions of the function of the brain, no longer considered only a connecting mechanism between senses and muscles but now known to originate activity.

Discovery that a guinea pig's brain originates impulses identical with the brain waves of man threw doubt on the idea that such rhythms are associated with higher mental activity.

Brain wave research showed that different parts of the brain apparently go to sleep separately and to different degrees, and that the rhythms in early sleep resemble those of some cases of mental illness.

Practicing psychologists formed a new professional society, the American Association of Applied and Professional Psychology, with strict entrance requirements.

Scientific support for the policy of majority rule was given by the finding that group judgment, in terms of correct answers to questions, was better than that of the average individual.

Stuttering in children was blamed on over-anxious parents when a study revealed that most very young stuttering children do not differ from others in lefthandedness or any other way, and that non-stuttering children show defects while learning to talk.

The blind were observed to have "optical" illusions through their seeing fingers.

Loud noise is not a universal cause of fear in infants but it does make all of them wiggle their toes, very slow motion pictures revealed.

Announcement that the Dionne quintuplets are identical in origin, yet differ in personality and mental ability, raised problems for psychological explanation.

Great individuality in the feeding behavior of infants was observed, pointing to the importance of individualization in infant feeding.

A new psychological measure—PQ, personality quotient—was reported to be more important for human relationships than is IQ.

Modern short-answer psychological examinations were challenged by a demonstration that they failed to distinguish between economically successful individuals and failures.

Growing children who are tall and of average weight are more intellectual than those whose growth is retarded, measurement of nearly 32,000 school children revealed.

Testing every child in a small midwest town who was aged between 10 and 13 was the goal of a comprehensive research program to learn the importance of "power" rather than speed in intelligence.

The best age for achievement in athletics was found to be the upper twenties; bowlers and billiard experts are slightly older.

Intelligence test scores of 300 children in foster homes were found to be only slightly related to the IQ's of the true mothers.

*Science News Letter, December 25, 1937*

